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MAMMALS OF SOUTHEAST ALBERTA

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1986

Hugh C. Smith



ALBERTA CULTURE

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ABSTRACT

The status and distribution of 61 species of mammals that are associated with southeastern Alberta is discussed. Three species have been introduced to the area by humans and seven are considered hypothetical because there is a lack of specimen evidence or historical reference to support their inclusion in the area.

The study encompasses that area of the National Topographic Map Sheet series titled Foremost, 72E. It extends from 49°N to 50°N and from 110°W to 112°W .

The mammal collections at the Provincial Museum of Alberta, the Zoology Museum University of Alberta, and the National Museum of Natural Sciences, Ottawa were consulted with respect to obtaining information for the Specimen Records section of the report.

Fifty-one species are used in discussing the biogeographic affinities of the mammals of southeastern Alberta. Five geographic faunal regions have contributed species to the area. A comparison to two other faunal studies supports the placement of the Foremost study area in the Saskatchewanian Mammal Province.

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INTRODUCTION:

Southeastern Alberta is an area of wide vistas, hot summers, cold winters, drifting dust and snow, and a small human population. In comparison to other areas of Alberta, it was occupied relatively late by settlers. The first settlers were ranchers, followed later by farmers. The agricultural base is now diversified into irrigated and dryland farming in some areas while ranching persists in others. The human population of the area has always been sparse, but the impact by people on some mammal species has been dramatic. Possibly the best known example is the extirpation of the Bison (Bison bison) herds that once roamed the area. However, Grizzly Bear (Ursus arctos), Gray Wolf (Canis lupus), and Swift Fox (Vulpes velox) have also been exterminated by humans. Inventories of other mammal species were not made until well after the land was settled. This current study was undertaken to inventory and examine the biogeographic affinities of the mammals that occur in southeastern Alberta, either now or in the recent past.

STUDY AREA:

The study area encompasses the portion of Alberta that is included in the Foremost sheet (72E) of the National Topographic Map series (Figure 1). It extends from 49°N to 50°N and from 110°W to 112°W. The area is part of the Eastern Alberta Plains area of the Interior Plains Division (Atlas of Alberta 1969). It covers an area of approximately 15,798 square kilometres (6100 square miles).

Topographically, the area is varied. The Milk River drains toward the south forming part of the Missouri River drainage system that

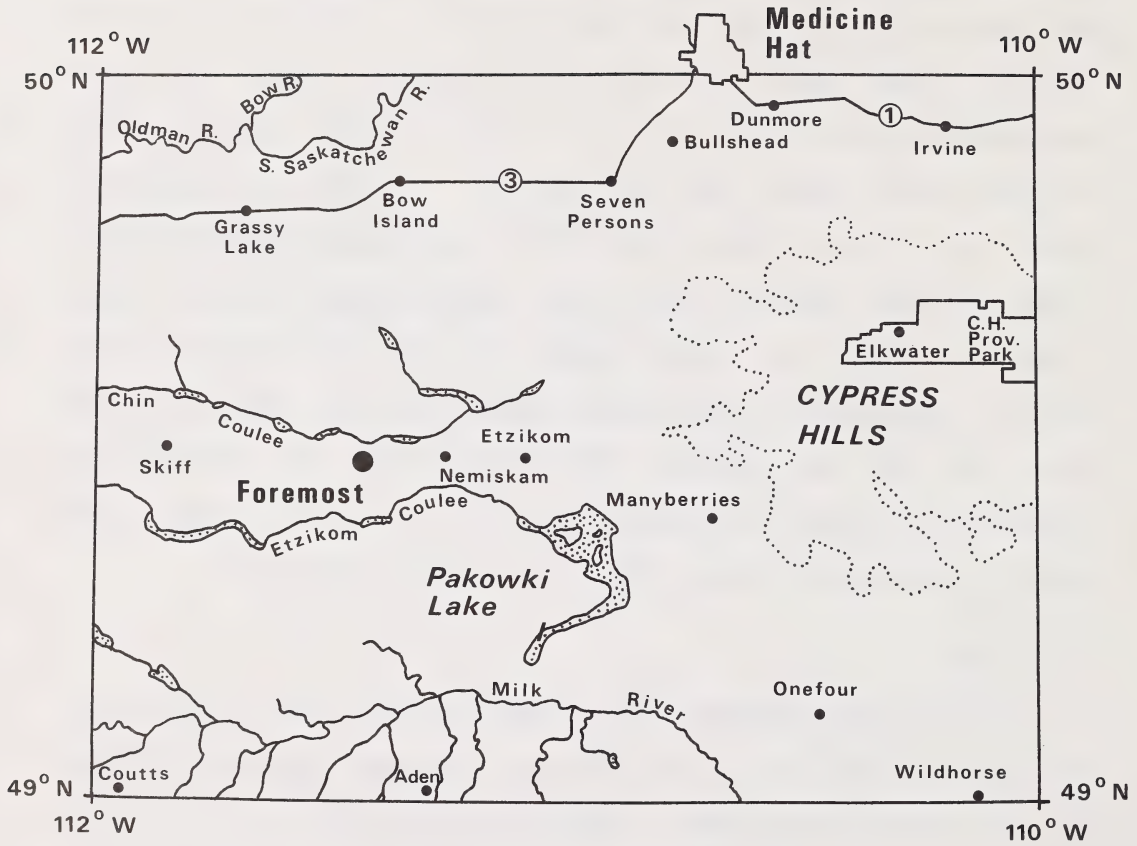


FIGURE 1. Southeast Alberta Study Area. Modified from Foremost Map Sheet (72 E)

eventually enters the Gulf of Mexico. The Bow and Oldman Rivers meet to form the South Saskatchewan River, which drains into Hudson's Bay. The interior of the area has an enclosed drainage system leading into Pakowki Lake. A seasonal water body, Pakowki Lake, has a considerable amount of water in the spring but by the end of summer it may be completely dry. There are several glacial meltwater channels throughout the area. Many of these have had dams constructed on them creating several man-made water bodies. The glacial history of the area has been studied and reviewed by Westgate (1968). The present topographic features are a result of glaciation during the Pleistocene.

The Cypress Hills are a prominent topographic feature of the area. The highest point of land in the study area, 1475 metres above sea level, is found in the Hills. The lowest elevation, 742 metres, is located in the Bullshead-Dunmore area. The west central portion of the region is gently undulating and is broken by Forty Mile, Chin, and Etzikom Coulees. The eastern and southern portions have rolling hills with highly eroded valleys that in some places are classified as badlands.

The vegetation of the area has been greatly modified by agricultural practices. Dryland and irrigated farming have introduced domestic plants to the area. The remaining "native" grasslands are found mostly in the southern and eastern parts of the study area. The major grasses that occur in the area are needle and thread (Stipa comata), blue grama (Bouteloua gracilis), spear grass (Stipa spartea), and June grass (Koeleria cristata). Sagebrush (Artemisia cana), western snowberry (Symphoricarpos occidentalis), creeping juniper (Juniperus horizontalis), chokecherry (Prunus virginiana), and saskatoon (Amelanchier alnifolia)

are found throughout the region in coulees and dry water courses. Cottonwoods (Populus spp.) are found along the major rivers. Lodgepole pine (Pinus contorta), white spruce (Picea glauca), and trembling aspen (Populus tremuloides) are the dominant trees of the Cypress Hills. Breitung (1954) and de Vries and Bird (1968) conducted vegetation surveys in the Cypress Hills and de Vries (1968) reported the results of a botanical survey of Writing-on-Stone Provincial Park. Newsome and Dix (1968) studied the forests in the Cypress Hills.

The climate of the region is extreme continental with hot dry summers and long cold winters. Average annual precipitation ranges from 300 to 450 mm with over 75 percent occurring from May to September (Walton and Walsh 1974). Over 2200 hours of sunshine occur annually. The coldest month is January with an average temperature of -12°C and the warmest is July with an average temperature of 16°C . Chinooks occur frequently throughout the year (Peters 1970).

METHODS:

In preparing this paper I consulted the mammal collections at the Provincial Museum of Alberta, the University of Alberta, and the National Museum of Natural Sciences. These three collections are referred to in the following annotated species list by the abbreviation UAZM for University of Alberta Zoology Museum, PMA for Provincial Museum of Alberta, and NMC for National Museums of Canada. The biology departments at the universities of Calgary and Lethbridge were contacted but neither institution had specimens from the study area.

Mammal surveys have been conducted in the area since the 1920's.

Williams (1945) investigated an area that extended in a strip eight townships wide north from the United States border between longitudes 110°W to 112°W. He recorded 20 species of mammals in his surveys from 1923 to 1926. Soper (1945, 1949) reported on the mammals found along the 49th parallel, in the Cypress Hills, and in the area that was incorporated into Nemiskam National Park (the centre of which was 49° 32'N and 111° 14'W). He recorded 16 species at Nemiskam and 30 species in his other survey. Halladay (1965) commented on the mammals found in the Cypress Hills and Smith (1972) made a brief list of mammals from the Pinhorn Grazing Reserve. Wallis (1976) included a review of mammals in his report on the Milk River Canyon. Results of these publications are summarized here.

Since 1969 staff from the Provincial Museum of Alberta have conducted collecting trips in the study area. Trips to the following areas have been made: Aden (1982, 1984), Cypress Hills (1969, 1973, 1977, 1984), Manyberries (1982), Pakowki Lake (1982), Pinhorn Grazing Reserve (1969, 1970, 1975, 1977), and Writing-on-Stone area (1977, 1984). In 1980 I received a large series of owl pellets that had been collected from 28 sites in the study area. The results from analysis of these pellets have been published (Smith 1981). In the annotated species list that follows frequent reference is made to this study.

North American vernacular or common names for mammals have not been standardized. I have, however, attempted to follow the arrangement and common names found in Jones et al. (1982) (Appendix 1). I have used the name "Bat" as the common name for the Myotis bats because "Bat" is better known and understood by lay people. I have used "Cougar" instead of

"Mountain Lion" for Felis concolor. I believe that "Mountain Lion" does not reflect the diversity of habitat in which this animal lives. I have retained Eutamias as the generic name for the Least Chipmunk and Lynx for the generic name for both the Canada Lynx and Bobcat because there is no consensus on the use of Tamias and Felis, respectively, for these mammals.

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ANNOTATED SPECIES LIST:

Masked Shrew, Sorex cinereus cinereus

Specimen records: (UAZM) Manyberries 1.

In a study of the cinereus-complex of shrews, van Zyll de Jong (1980) demonstrated that this complex consisted of two species Sorex cinereus and Sorex haydeni.

Sorex cinereus prefers the "cover of trees, shrubs, or tall herbaceous vegetation" while Sorex haydeni occupies the "semi-arid to sub-humid climate" of the northern prairies and prefers the "low cover of the prairie vegetation" (van Zyll de Jong 1983: 75).

The Masked Shrew is poorly known in the grassland regions. Halladay (1965) mentioned Sorex cinereus as occurring in the Cypress Hills, but no specimens are known. Smith (1981), on the basis of owl pellet analysis, reported that this species occurred at seven of 28 sites in the east-central portion of the study area and concluded that it was widely distributed and locally abundant.

Prairie Shrew, Sorex haydeni

Specimen records: (UAZM) Aden 1, Milk River 1, Onefour 3, Orion 1.
(PMA) Elkwater 2.

This shrew occurred in four of 28 sites where owl pellets were collected (Smith 1981). On the basis of specimen records in museums and the known ecological parameters of this species (van Zyll de Jong 1983), this shrew is seemingly more widely distributed in the study area and is more common than Sorex cinereus, contrary to the evidence presented in Smith (1981).

Dusky Shrew, Sorex monticolus obscurus

Specimen records: (UAZM) Cypress Hills 1, Manyberries 1, "along Milk River" 1. (PMA) Pinhorn Grazing Reserve 2. (NMC) Cypress Hills (Findley 1955).

This species was formerly known as Sorex vagrans, but Hennings and Hoffmann (1977) reviewed the S. vagrans complex and concluded that Sorex monticolus is a separate species.

This species is not common in the area but the specimen records suggest it has a wide distribution.

Van Zyll de Jong (1983) indicated that Sorex monticolus is usually associated with the forest floor litter and is rare or absent in open grassy areas. The two specimens housed in the Provincial Museum were collected along a grass-covered channel of a water reservoir in essentially open grassland.

Little Brown Bat, Myotis lucifugus carissima

Specimen records: (PMA) Skiff 2, Deer Creek Ranch (Tp1 R12 W4)2, Elkwater 2, Hays Lake Ranch (S23 Tp3 R13 W4) 60.

There are few colonies of this bat in the area. Provincial Parks personnel report that bats, possibly of this species, are frequently seen flying around the townsite of Elkwater but it is not known where they roost. The specimens from Hays Lake Ranch were occupying the rafters of a granary. This nursery colony was destroyed because of a public complaint to wildlife authorities.

The Hays Lake Ranch collection was obtained 8 August 1980 and consisted of 5 adult females, 33 immature females, and 21 immature

males. This is the only evidence of a nursery colony of this species in the study area.

The specimens from the Deer Creek Ranch were netted over a water hole situated on the open prairie. Their roost location was not discovered.

Little Brown Bats cannot be considered common in the area.

Long-eared Bat, Myotis evotis evotis

Specimen records: (PMA) Deer Creek Ranch (Tp1 R12 W4) 4. (Royal Ontario Museum) Deer Creek Ranch 1.

This bat is not common nor is it widely distributed in the area. It probably summers in the area but there is no evidence to confirm this. All five specimens have been collected in the fall.

Long-legged Bat, Myotis volans interior

Specimen records: (PMA) Deer Creek Ranch (Tp1 R12 W4) 7.

This bat appears confined to the vicinity of the Milk River. Smith (1931), however, reported the remains of a bat in an owl pellet that could possibly be this species. The pellet came from a farm located at S25 Tp8 R12 W4, a considerable distance from the Milk River.

No roosts have been found in the area, but three specimens were netted in early June in the vicinity of sandstone cliffs along the Milk River. The other specimens were netted over a prairie slough in September.

The species cannot be considered common.

Western Small-footed Bat, Myotis ciliolabrum ciliolabrum

Specimen records: (PMA) Deer Creek Ranch (Tp1 R12 W4) 2.

The two specimens collected were mist-netted at a prairie slough near the Milk River. This species is not common in the area but it can be expected to occur along the Milk River valley where there are rocky outcrops that provide roosting sites.

Silver-haired Bat, Lasionycteris noctivagans

Specimens records: (PMA) Bow Island 1.

Several specimens have been collected in the area but only one has been deposited in the museum collections surveyed. Records from Fish and Wildlife files indicate this species from the following localities; Irvine, Burdett, Bow Island, Skiff, and Foremost (M. Pybus in litt.). These are records of specimens submitted for rabies testing. Schowalter et al. (1978) indicated that the collection of rabies - suspect Silver-haired Bats is bi-modal in form. There is a peak in numbers submitted in June and another peak in August-September. This is similar to the reported occurrence of this species in the study area. Of the records available, four specimens were reported in June (the earliest being 4 June), one in July, three in September, and one in October. The latter record, 24 October, is the latest date reported for this species in the area. The specimens consisted of seven adult females, two juvenile males, and one female of unknown age.

Silver-haired Bats are common migrants in Alberta (Schowalter 1979). There are no reports of Silver-haired Bats residing in the study area and there are no reports of young being born there.

Big Brown Bat, Eptesicus fuscus pallidus

Specimen records: (PMA) Deer Creek Ranch (Tp1 R12 W4) 1, Seven Persons (S1 Tp10 R7 W4) 3, Bow Island (Tp10 R11 W4) 53, east of Milk River (S9 Tp2 R13 W4) 4. (UAZM) Milk River valley 3.

The Big Brown Bat is the most widely distributed bat species in the study area. It is locally common at some sites.

The colony at Bow Island is in an abandoned theatre. Numerous attempts have been made by Fish and Wildlife personnel to eliminate the colony without success. In one attempt in June, 21 females were captured, of which 20 contained embryos in various stages of development. One female had two embryos and one female was not pregnant (unpublished data). Another collection from the same site in late August consisted of seven adult females and one adult male. In a September collection, 22 adult females and three adult males were taken.

No studies have been made on this species to determine where it spends the winter. There have been no reports of these bats wintering in the area, but as they are known to winter farther north in buildings in Edmonton (Schowalter and Gunson 1979), it is possible that some also winter in the study area.

Hoary Bat, Lasiurus cinereus cinereus

Specimen records: None is known.

The only records of this bat in the area are specimens collected at Skiff and Seven Persons (Schowalter and Dorward 1978). These specimens were submitted for rabies testing and were not saved.

Hoary Bats can be expected in the area during their spring and fall

migration. Because there are so few records for the area, it is difficult to assess their abundance, but they are probably not uncommon during migration.

Nuttall's Cottontail, Sylvilagus nuttallii grangeri

Specimen records: (UAZM) Cypress Hills 2, Manyberries 2, Nemiskam 4, Wildhorse 5, Milk River Valley 1. (PMA) Pinhorn Grazing Reserve 5, Deer Creek Ranch 2, Aden 4, Coutts 3. (NMC) Elkwater 1, Deer Creek 4.

Cottontails are found throughout the area in suitable habitat. They are relatively common, especially in brushy areas along the Milk River valley and in Writing-on-Stone Provincial Park. They can also be found in sagebrush and buffaloberry thickets in the grassland areas.

Smith (1972) reported that cottontails were common along the Milk River and Halladay (1965) indicated that they were relatively scarce and irregular in the Cypress Hills. Soper (1964: 121) indicated that they occur along the "fringes of the Cypress Hills," and previously he (1949) reported they were "fairly common" in Chin Coulee.

Snowshoe Hare, Lepus americanus americanus

Specimen records: (NMC) Lodge Creek 1, Nicholls Spring 1.

Williams (1946) reported that Snowshoe Hares were common at Manyberries Creek and in the Cypress Hills in 1925. Soper (1964) stated that they occur in the wooded areas of the Cypress Hills but not in other areas of southeastern Alberta. Hoffmann et al. (1969) indicated that the species is found in "willow thickets along the length of the Milk River valley" in Montana. No specimens or documented observations of this

species have been obtained in the Milk River valley in southeastern Alberta. Either the species no longer occurs here or it occurs in such low numbers that it has not been encountered recently.

White-tailed Jack Rabbit, Lepus townsendii campanius

Specimen records: (UAZM) Milk River valley 2. (PMA) Writing-on-Stone 1, Coutts 1, Pakowki Lake 2, Aden 1.

Although jack rabbits are found throughout the study area, they are nowhere abundant. This has not always been the case. In the local histories of Bow Island and Foremost, "rabbit" drives were held because of the large numbers of "rabbits" that occurred in these areas in the 1920's. One story tells of a drive in the Winnifred area in the early 1920's where approximately "three to four hundred rabbits" were killed (Thomas no date). In 1927 in the Foremost district, "the countryside was overrun with rabbits," the "rabbits" were driven into fenced enclosures but no count was made on the number killed (Buis 1975: 237). Williams (1946) reported jack rabbits common at Verdigris Coulee and Milk River valley in 1923 and at Foremost and Cypress Hills in 1924. He reported that rabbits were "dying off" in 1925 at Manyberries, but in June 1926 they were "very common" at Elkwater. Soper (1949) stated that they were not "particularly common" in Nemiskam National Park.

Least Chipmunk, Eutamias minimus borealis

Specimen records: (UAZM) Cypress Hills 1. (NMC) Eagle Butte 13, Nicholls Spring 11.

The only part of the study area in which this species is known to

occur is the Cypress Hills (Soper 1964). Halladay (1965) considered it common there. During a field trip to the Cypress Hills in 1984, I did not see any evidence of the Least Chipmunk. During conversations with park wardens, I was informed that chipmunks occur fairly regularly around the cottages in Elkwater.

Yellow-bellied Marmot, Marmota flaviventris nosophora

Specimen records: (UAZM) Aden 1. (PMA) Writing-on-Stone 1.

Moore (1952) first reported the occurrence of this species in Alberta on the basis of a skin and skull obtained in the Aden area. He suggested that this species had recently moved into the province and had spread north to the Milk River valley between Aden and Verdigris Coulee. I have observed Yellow-bellied Marmots at Writing-on-Stone Provincial Park and at Black Butte. The extent of the range of this species in the study area is not well known, but it probably occurs in suitable habitat along the Milk River valley, Verdigris Coulee, and other coulees in the Milk River drainage system. Johnson (1970) considered the species common along the Milk River.

Richardson's Ground Squirrel, Spermophilus richardsonii richardsonii

Specimen records: (UAZM) Cypress Hills 1. (PMA) Manyberries 1, Pakowki Lake 2, Coutts 4, Writing-on-Stone 1. (NMC) Nicholls Springs 4.

The Richardson's Ground Squirrel is widely distributed in the area and may be locally common. Soper (1949) considered it locally abundant in Nemiskam National Park. Halladay (1965) indicated that it was once

common in the Manyberries and Wildhorse area, but it began to disappear in the 1940's, possibly as a result of an increase in the number of rattlesnakes. While speaking to ranchers in the area about this ground squirrel, I received a similar comment regarding rattlesnakes. Smith (1972) commented on their absence on the Pinhorn Grazing Reserve but indicated they were common at Manyberries. Smith (1981) reported the remains of this ground squirrel in the pellets of Great Horned Owls.

Thirteen-lined Ground Squirrel, Spermophilus tridecemlineatus pallidus

Specimen records: (UAZM) Cypress Hills 2. (NMC) Nicholls Springs 9.

Soper (1964) reported that specimens had been collected at Eagle Butte and Thelma. As well, he reported that they occurred at Elkwater (Soper 1961). Wallis (1976) stated that this species is "localized in areas of sandy soil along Kennedy Creek." During the course of several field trips to the area, I did not encounter or see evidence of this ground squirrel. On the basis of records reporting its occurrence, it is probably quite widely distributed but nowhere common in the study area.

Red Squirrel, Tamiasciurus hudsonicus

Specimen records: (UAZM) Cypress Hills 7. (PMA) Elkwater 1.

The Red Squirrel is found only in the Cypress Hills in the study area. It is not native to the Hills, but was introduced into the Saskatchewan portion of the Hills and has since become common throughout the wooded portion of the Hills (Halladay 1965). No subspecific determination has been made on the population of Red Squirrels found in the Hills.

Northern Pocket Gopher, Thomomys talpoides

Specimen records: (UAZM) Cypress Hills 3, Orion 1, St. Kilda 3, Reesor Lake 68. (PMA) Coutts 1, Elkwater 2, Pinhorn Grazing Reserve 2, Deer Creek Ranch 1.

Soper (1964) did not consider the Northern Pocket Gopher common in southeastern Alberta. He did say, however, that it was widely distributed. Halladay (1965) indicated that it was found in woodland openings in the Cypress Hills. On the basis of specimens available in collections, pocket gophers can be considered to be widely distributed in the study area and locally common.

There is some doubt as to the subspecific status of the pocket gophers in Alberta. MacDonald (1969) suggested that there are two subspecies Thomomys talpoides cognatus and Thomomys talpoides talpoides and that it is the latter subspecies that is found in southeastern Alberta. Hall (1981), on the other hand, considers the pocket gophers that occur in the study area to belong to Thomomys talpoides andersoni.

Olive-backed Pocket Mouse, Perognathus fasciatus

Specimen records: (UAZM) Foremost 2, Pinhorn Grazing Reserve 2. (PMA) Manyberries 2, Pinhorn Grazing Reserve 2, Crow Indian Lake 1.

Moore (1952) reported specimens collected at Chin Coulee and Manyberries, the first specimens collected in the province. These animals are difficult to collect by usual trapping methods and as a result a false impression may be attained as to the distribution and abundance of the species if trapping results are used. Smith (1981), by

examining owl pellets, found that the Olive-backed Pocket Mouse made up 4.7 percent of the diet of the Great Horned Owl (Bubo virginianus) and 10.7 percent of the diet of the Burrowing Owl (Athene cunicularia). On the basis of pellets collected in the study area they can be considered relatively common.

The subspecific status of Perognathus fasciatus in Alberta is uncertain. Jones (1953), Pefaur and Hoffmann (1974), and Hall (1981) assigned the name P. f. olivaceogriseus to the animals found here. Conversely, Williams and Genoways (1979) assigned the name P. f. fasciatus to the same group on the basis of multivariate tests. They did not, however, have any Albertan specimens. The resolution of the subspecies problem in Alberta will require a larger sample from the province.

Beaver, Castor canadensis missouriensis

Specimen records: (UAZM) Milk River, 17 mi. W. Wildhorse 1. (NMC) Dominion Range Station near Milk River 1.

Beavers occur along the Milk River and in the Cypress Hills, but they are not common. Soper (1964: 182) listed several localities where Beavers occur in the study area, but indicated they were "detected only very sparingly at widely separated points." I have observed Beavers along the Milk River and in the Cypress Hills and I was informed by wardens from Cypress Hills Provincial Park that Beavers are regularly trapped in the Cypress Hills and that they are more common than muskrats.

Western Harvest Mouse, Reithrodontomys megalotis dychei

Specimen records: (UAZM) Pinhorn Grazing Reserve 1.

The Western Harvest Mouse is rare in the area with only one specimen available from the study area. It is not possible to assess its distribution or abundance on this basis.

Deer Mouse, Peromyscus maniculatus nebrascensis

Specimen records: (UAZM) Cypress Hills 3, Eagle Butte 4, Onefour 28, Orion 4, Foremost 2, St. Kilda 2, Aden 3, Wildhorse (19 miles west) 5, Manyberries 10, Pinhorn Grazing Reserve 11. (PMA) Aden 51, Bow Island 10, Coutts 3, Cypress Hills 16, Deer Creek Ranch 3, Kennedy Creek 1, Manyberries 14, Milk River valley 11, Pakowki Lake 3, Pinhorn Grazing Reserve 28, Police Coulee 10, Sage Creek 5, Seven Persons 3, Writing-on-Stone 1.

The Deer Mouse is the most common and most widely distributed rodent in the study area. Williams (1946) said this species was "very numerous" at his campsite south of Manyberries. Soper (1949) described it as being "common and almost universally distributed" at Nemiskam National Park. Smith (1981) found that remains of this species occurred in owl pellets at almost all sites that pellets were collected.

The subspecies of Deer Mouse found in southern Alberta is P. m. nebrascensis. Soper (1964) and other authors use the name P. m. osgoodi but Jones (1958) has shown that P. m. osgoodi should not be applied to this race of Deer Mouse.

Northern Grasshopper Mouse, Onychomys leucogaster missouriensis

Specimen records: (UAZM) Foremost 2, Manyberries 1. (PMA) Pinhorn Grazing Reserve 4.

Soper (1954) said that this species was becoming more common and widespread than it had been in the 1920's. In a study of the foods of Great Horned Owls, I found that grasshopper mice were found at 33 percent of the pellet collection sites but that they made up only 2 percent of the total food consumed (Smith 1981). On this basis, they are not considered common but they are widely distributed.

An analysis of the stomach contents of two O. leucogaster specimens showed that these mice preyed on Coleoptera of the Carabidae and Curculionidae families (unpublished data).

Bushy-tailed Wood Rat, Neotoma cinerea cinerea

Specimen records: (NMC) Dominion Range Station near Milk River 1.

Soper (1954) considered the Bushy-tailed Wood Rat as "irregular" along the Milk River listing Writing-on-Stone Provincial Park as a place where these rodents have been recorded. Wallis (1976) states that they are "common in sandstone outcrops" and that the Milk River drainage is the only area where they are found in the mixed grassland area. I have not encountered this species in the study area.

Southern Red-backed Vole, Clethrionomys gapperi loringi

Specimen records: (PMA) Elkwater 3. (NMC) Eagle Butte 13, Nicholls Springs 10.

The wooded areas of the Cypress Hills are the only places where the

red-backed vole is found in the study area. Halladay (1965) reported that they were "plentiful in the woods and brushy parts of the Cypress Hills...."

Meadow Vole, Microtus pennsylvanicus insperatus

Specimen records: (UAZM) Cypress Hills 8, St. Kilda 2, Eagle Butte 1, Onefour 3, Nemiskam National Park 1, Manyberries 1, Pinhorn Grazing Reserve 4. (PMA) Pinhorn Grazing Reserve 3, Deer Creek Ranch 1, Cypress Hills 20.

The Meadow Vole is one of the most common and widespread rodents in the study area. In a food study of Great Horned Owls and Burrowing Owls in the study area, I found that this species occurred at 18 of 28 sites (64 percent) and made up 16 percent of the diet of these owls (Smith 1981). Soper (1949), on the other hand, indicated that it occurred only "sparingly" at Nemiskam National Park.

Long-tailed Vole, Microtus longicaudus vellerosus

Specimen records: (PMA) Pinhorn Grazing Reserve 1. (NMC) Nicholls Springs 1, Sweetgrass Hills (49°05'N 111°33'W) 2.

Long-tailed Voles are seemingly scarce in the study area. Two specimens were reported as prey items of Great Horned Owls by Smith (1981). Soper (1946, 1954) reported specimens collected at Eagle Butte and said they occurred "sparingly" along the Milk River.

Sagebrush Vole, Lagurus curtatus pallidus

Specimen records: (UAZM) Foremost 3, Onefour 1, Manyberries 2, Pinhorn Grazing Reserve 8. (PMA) Sage Creek 1. (NMC) Lodge Creek 6.

Soper (1964) indicated that prior to the 1950's this species was poorly known in the province. Since then, specimens of this species have been collected at several locations including sites in our study area. During the course of identifying prey remains in owl pellets collected in the study area, Sagebrush Voles were present in pellets collected at 64 percent of the sites and made up 13 percent of the diet of the owls (Smith 1981). On this basis they can be considered relatively common and widely distributed in the area.

Muskrat, Ondatra zibethicus cinnamominus

Specimen records: (PMA) Coutts 3, Pinhorn Grazing Reserve 2, Deer Creek Ranch 3.

Muskrats are found almost anywhere permanent water is located. The number of individuals present in any given waterbody is variable. Muskrats occur throughout the study area and can be locally common.

House Mouse, Mus musculus

Specimen records: (UAZM) Cypress Hills 1, St. Kilda 1, Aden 5, Wildhorse (19 mi. W.) 1. (PMA) 17 mi. E. of town of Milk River 1.

The House Mouse, not native to North America, arrived relatively early with immigrating Europeans. It is now well established in the study area and may be locally common where buildings are present.

Western Jumping Mouse, Zapus princeps minor

Specimen records: (UAZM) Aden 1, Cypress Hills 4. (PMA) Elkwater 3. (NMC) Lodge Creek 1.

The Western Jumping Mouse is not common in the area. The specimens in the collection of the Provincial Museum were collected from a damp hay meadow and from alongside a creek in a spruce stand. If this is indicative of the preferred habitat of this species, the study area is not conducive to supporting large or wide spread populations, as this habitat is severely limited in occurrence.

Porcupine, Erethizon dorsatum epixanthum

Specimen records: (UAZM) Cypress Hills 2. (PMA) Aden 1, Coutts 2. (NMC) Lodge Creek 3, Nicholls Springs 2, Dominion Range Station 1.

Porcupines are not observed frequently in the area but this may not be indicative of their abundance. Brushy and wooded areas, the habitat preferred by Porcupines, is widely but locally distributed in the study area, as are the specimen records for the species. Soper (1949) said they were "fairly common" along the Milk River in 1927 but he did not observe any in Nemiskam Park.

Coyote, Canis latrans latrans

Specimen records: (PMA) Pinhorn Grazing Reserve 1. (NMC) Nicholls Springs 1, Walsh 1, Cypress Hills 4, Ross Coulee 1.

Coyotes are the largest carnivores now resident in the area. They are widely distributed and they are probably common.

Gray Wolf, Canis lupus irremotus

Specimen records: Eagle Butte (1) in Alberta Fish and Wildlife Collection, Edmonton.

According to reports of travellers on the prairies in the 1800's,

wolves were very numerous (Stelfox 1969). "Kootenai" Brown is said to have "averaged" 1,000 wolves a winter in southern Alberta (Stelfox 1969). Elliott (1971) reported that the last wolf taken at Elkwater was killed in 1911-12. Williams (1946) reported wolves in the Aden area and Milk River in 1923 and heard wolves howling in the Cypress Hills in 1925. Although there have been subsequent wolf reports for the area [for example, Gunson (1983) reported a wolf shot near the Q Ranch (S34 Tp3 R1 W4) in 1971 and another at Eagle Butte (S12 Tp8 R4 W4) in 1972 (Gunson, personal communication)], there is currently no known resident population.

Red Fox, Vulpes vulpes regalis

Specimen record: (UAZM) Foremost 1. (PMA) Writing-on-Stone 1, Foremost 1.

The Red Fox is widely distributed and increasing in numbers in the study area (D. Schowalter, personal communication). It occurs regularly in the Cypress Hills (Halladay 1965). Elliott (1971) reported finding the remains of Red Foxes in his archaeological dig in the Cypress Hills. Neither Williams (1946) nor Soper (1945, 1949) mention Red Foxes in southeastern Alberta.

Swift Fox, Vulpes velox

Specimen records: None is known.

The last naturally occurring Swift Fox was seen in Alberta in 1938 near Manyberries (Soper 1964). In 1983 a small number of these foxes were introduced into the area by the Canadian Wildlife Service (Russell and Scotter 1984).

The subspecies that is reported to be found in Alberta is Vulpes velox hebes (Hall 1981), however, Reynolds (1983) stated that the evidence for such a classification remains to be established.

Grizzly Bear, Ursus arctos

Specimen records: None is known.

The Grizzly Bear that inhabited the plains of southeastern Alberta is extinct. Halladay (1965) indicated Grizzly Bears were common in the Cypress Hills in the mid-1800's. Soper (1964) states that the last records of Grizzly Bears in southeastern Alberta were about 1885. Reports of Grizzly Bears in the Cypress Hills indicate that the area from Elkwater to Medicine Lodge was a favored area (Morrow 1923).

No specimens are known from this region of Alberta, but the National Museums of Canada has five skulls from the Cypress Hills in Saskatchewan (Cumbaa and Sciscenti 1978).

Raccoon, Procyon lotor hirtus

Specimen records: (PMA) Foremost 1, Coutts 1.

The status of the Raccoon in southeastern Alberta is not clear. Its occurrence on the plains is irregular except along the Milk River where it occurs regularly (D. Schowalter, personal communication). In 1916 Raccoons occurred no farther west than Estevan, Saskatchewan, but in November 1959 a Raccoon was shot at Fox (Cypress Hills) (Soper 1964). Halladay (1965) indicated that Raccoons were common in the Cypress Hills, but were rare on the plains. No inventory has been made, but Raccoons are common in Writing-on-Stone Park and are considered a nuisance animal around garbage cans (J. Wojcicki, personal communication).

Ermine, Mustela erminea invicta

Specimen records: None is known.

Ermine or Short-tailed Weasels are not common in southeastern Alberta. No specimens are known from the area, but Soper (1946) said they occurred in the Cypress Hills and Smith (1981) reported finding skeletal remains of one individual in a Great Horned Owl pellet that was collected in the study area.

Least Weasel, Mustela nivalis rixosa

Specimen records: (PMA) Etzikom 1 (skull).

Soper (1964) does not record any specimens of the Least Weasel in southeastern Alberta. Halladay (1965) stated that it was less common than other weasel species in the Cypress Hills. Smith (1981), on the basis of skeletal material recovered from owl pellets collected in the study area, considered that they were widely distributed and perhaps locally common.

Long-tailed Weasel, Mustela frenata longicauda

Specimen records: (NMC) Sweetgrass Hills 1.

The Long-tailed Weasel is widely distributed in the area (Smith 1981) but it is not common. Soper (1946) reported specimens from Nemiskam and Writing-on-Stone and Williams (1946) listed specimens from Aden, Nemiskam, Foremost, and Merryflat. The disposition of these specimens is not known.

Mink, Mustela vison lacustris

Specimen records: (PMA) Foremost 1.

Mink are not common in southeastern Alberta. Soper (1961, 1964) reported them as present at Elkwater Lake in the Cypress Hills but absent from the plains area. The construction of irrigation channels may enable the Mink to increase both in abundance and distribution.

Badger, Taxidea taxus taxus

Specimen records: (UAZM) Eagle Butte 1, Foremost 1.

The status of Badgers in southeastern Alberta is uncertain. They are probably widely distributed and occur wherever there are ground squirrels and pocket gophers. Soper (1946) found them relatively abundant in 1927 but they had become scarce between 1934 and 1943. Williams (1946) observed Badgers at Nemiskam, Foremost, and lower Milk River in 1924. Soper (1949) reported two or three pairs inhabiting Nemiskam National Park.

Striped Skunk, Mephitis mephitis hudsonica

Specimen records: (UAZM) Comrey 1.

Striped Skunks are widely distributed but fluctuate in abundance in the study area. They are common on cultivated lands where there are old buildings, but they are much less common on grasslands (D. Schowalter, personal communication). Halladay (1965) indicated they were relatively common in the Cypress Hills, whereas Soper (1946) did not encounter any at Nemiskam.

Cougar, Felis concolor missoulensis

Specimen records: None is known.

Soper (1964) reported several occurrences of Cougars in the area of Cypress Hills in 1897, 1910, and 1930 (reported by Brown 1947), and at Police Coulee in 1951. There are no recent sightings and no specimens are known to have been collected in the area. White (1982) lists eleven records of Cougars in the Cypress Hills of Saskatchewan. However, as Cougars tend to wander, it should not be surprising that an individual will occasionally come into the area. Since all the sightings are of individuals and recent sightings are rare, it is not likely that any permanent population exists in the area.

Canada Lynx, Lynx canadensis canadensis

Specimen records: None is known.

Soper (1964) includes southeastern Alberta in the range of the Canada Lynx. It has been reported along the Milk River between Police Coulee and Writing-on-Stone and in the Cypress Hills until the early 1930's (Soper 1946, 1961). Nothing is known of the current status of this animal in the area as there are no recent sightings and no specimens are known from the area. Hoffmann et al. (1969) said that a specimen was collected near Whitlash, Liberty County, Montana, 4 miles south of the Canadian border crossing at Aden, Alberta.

Bobcat, Lynx rufus pallescens

Specimen records: (UAZM) S.W. of Comrey on Milk River 1, 5 miles S. Thelma 1, Wildhorse 1.

Bobcats are not frequently encountered in the area but they may be more common than records indicate. Soper (1964) reported Bobcats being

killed in the Cypress Hills. Mitchell (1980), quoting Barrett (1978), stated that 68% of mortality to young Pronghorns can be attributed to either Coyotes or Bobcats. Herrero (1984) said that Bobcats were implicated in the death of at least one recently released Swift Fox. The chief park warden in Cypress Hills Provincial Park told me that Bobcats, though scarce, are trapped on a regular basis by ranchers in the area. He indicated that two or three Bobcats are taken every year.

Wapiti, Cervus elaphus

Specimen records: None is known.

Cowie (1913: 436), commenting on the abundance of Wapiti that were found in the Cypress Hills in 1871-72, said "incredible numbers of grizzly bears and red deer (wapiti) were killed in the Cypress Hills that year, of which our share of the skins numbered 750 and 1500 respectively, and probably the traders and Metis who were not our customers got as many more." Soper (1964) said that by 1909 Wapiti were exterminated from the Hills.

It is difficult to know what subspecies of Wapiti was originally found in the Cypress Hills, but it was probably Cervus elaphus manitobensis (Bryant and Maser 1982). In 1938, Wapiti from Wainwright were introduced into the Hills (Dickinson 1968). At present they still occur only in the Cypress Hills although they may make excursions out of the Hills during the winter to forage on hay stacks.

Mule Deer, Odocoileus hemionus hemionus

Specimen records: (PMA) Manyberries 1, Pinhorn Grazing Reserve 1, Coutts 2.

Mule Deer are common and found throughout the region. Webb (1959) reported that the number of Mule Deer in the province began to decline in the late 1800's and that by 1900 they were uncommon; however, since then their numbers have steadily increased. Smith (1972) observed several on the Pinhorn Grazing Reserve and along the Milk River. Wallis (1976) reported herds of up to 15 were very common in badland and brushy coulee areas.

White-tailed Deer, Odocoileus virginianus dacotensis

Specimen records: None is known.

White-tailed Deer are of sporadic distribution and abundance in this area. In some areas they are common - along the Milk River (Wallis 1976) and in the Cypress Hills (Halladay 1965) - while in other areas they are seldom seen. In a study in the Cypress Hills, Kramer (1971) found in one year (1968) Mule Deer were twice as abundant as White-tailed Deer (947 mule to 436 white-tails). The next year (1969) white-tails outnumbered Mule Deer (346 white-tails to 278 mule).

Moose, Alces alces andersoni

Specimen records: None is known.

Moose are not native to the area, but in 1956, four moose from Elk Island National Park were introduced into the Cypress Hills (Barrett 1972). Without hunting pressure and with no natural predators, they have

increased in numbers so that all available range is occupied (Barrett 1972). Occasionally Moose leave the Hills and are observed along the Milk River, but permanent populations are unlikely outside the Cypress Hills (Barrett personal communication).

Pronghorn, Antilocapra americana americana

Specimen records: (UAZM) Wildhorse 2, Elkwater 1, Pinhorn Grazing Reserve 1. (PMA) Manyberries 1.

Pronghorn are the most abundant wild ungulate in the region. They are uncommon in cultivated areas but very common in the grasslands. Mitchell (1980) documents a ten-fold fluctuation in the Pronghorn population in southern Alberta from 1900 to 1974 with estimates ranging from 2000 to 20,000 individuals. Nemiskam National Park was established near Nemiskam, Alberta in 1922 to protect the diminished Pronghorn population with the hopes of re-populating the grasslands. The program was so successful that the park was decommissioned in 1947 (Soper 1949).

Bison, Bison bison bison

Specimen records: None is known.

Bison no longer occur in the area and it is difficult to determine what the status of this animal was before it disappeared. Morrow (1923) recounts the disappearance of Bison from the Medicine Hat area and indicates that the last Bison shot was taken near Irvine in 1882.

HYPOTHETICAL SPECIES:

Soper (1964) includes this study area in the ranges of several species that I considered hypothetical. To date there are no sightings, historical records, or specimen evidence to indicate that these species have occurred in the area.

Red Bat, Lasiurus borealis

Specimens of this species have been obtained at Enchant, 40 km northwest of the study area. It could be expected to occur in the Cypress Hills and possibly along the wooded sections of the Milk River.

Ord's Kangaroo Rat, Dipodomys ordii

There is suitable habitat for this species around Pakowki Lake, but no specimens have been obtained from the study area. They are known to occur approximately 100 km north of the study area.

Prairie Dog, Cynomys sp.

Elliott (1971) reported finding the mandible of a Cynomys in an archaeological context in the Cypress Hills. Soper (1964) indicates the closest that prairie dogs came to Alberta was 25 or 30 miles south in Montana but no evidence has been found to substantiate the existence of prairie dogs in Alberta in historic times.

White-footed Mouse, Peromyscus leucopus

Soper (1964) lists several localities in the study area where he said

specimens of this species were collected, ie. Groton, Lodge Creek, and Eagle Butte. When these specimens were examined by C.G. van Zyll de Jong they were identified as Peromyscus maniculatus (van Zyll de Jong personal communication). No specimens of Peromyscus leucopus are known from the study area.

Gray Fox, Urocyon cinereoargenteus

While working in southern Alberta, Soper was informed by a rancher that a gray-coloured fox was seen in the Milk River valley south of Pakowki Lake (Soper 1964). Soper discounted the story until Moore (1952) reported a specimen of a Gray Fox from the Lake Athabasca area, the only record of this species for the province. Alberta is very remote from the current range of the Gray Fox and any records of its occurrence should be documented by specimen evidence.

Black-footed Ferret, Mustela nigripes

Black-footed Ferrets may have occurred in this area as specimens have been obtained at Gleichen and Rosebud in the past (Soper 1964). Both of these localities are northwest of the study area. Pinel (1973) reported finding the carcass of an animal in the Pakowki Lake area that he identified as this species. Unfortunately no part of the carcass was salvaged to confirm the identification.

Bighorn Sheep, Ovis canadensis

Soper (1964) indicated that Bighorn Sheep occurred in the

Alberta-Montana Sweetgrass Hills. Wallis (1976) reported that there is historical evidence that Bighorn Sheep occasionally moved out of the Sweetgrass Hills to the Milk River. He did not, however, give any indication as to where this information originated and there is no specimen evidence to support the claim. Graspontner (1980) reported that B. Burles collected a skull of a "mountain sheep" from Deer Creek, but the location of the skull is unknown.

BIOGEOGRAPHY OF MAMMALS OF SOUTHEASTERN ALBERTA

In biogeographic studies it is possible to show, by analyzing the ranges of the constituent species, that some species are closely associated with one geographic area while others are associated with different areas. Armstrong (1972) used the term "faunal element" to describe a group of species that has a common geographic centre of origin. Hoffmann and Jones (1970) indicated that it is from such centres that mammals dispersed to occupy areas in which they are now found.

Five geographic centres have contributed mammals to southeastern Alberta: Boreal, Campestrian, Cordilleran, Great Basin, and Sonoran. Another group, termed "widespread," consists of species that have ranges that are so extensive that it is not possible to assign them to a particular faunal element (Appendix 2).

There are no apparent physical barriers to restrict the movement of mammals to the study area. Due to the lack of physical barriers, the ecological requirements of a species become important considerations when discussing routes of invasion and dispersal.

Sixty-one species of mammals are associated with southeastern Alberta. Fifty-one species are used in the discussion of biogeographic affinities. Three species that have been introduced, accidentally or intentionally, by humans and seven species of hypothetical status are not included in the biogeographic analysis (Appendix 2). Two species, Vulpes velox and Cervus elaphus, although now occurring in the area as a result of introductions, are included in the discussions because they were previously part of the fauna of the area.

Boreal Faunal Element

Eight species are assigned to this element. Most of these species are found in low numbers or are restricted to a relatively small area. Species associated with this element have a close affinity with the taiga or boreal forest region of northern Canada.

Lepus americanus, Eutamias minimus, and Clethrionomys gapperi are confined to the Cypress Hills, and are relict and disjunct populations. They probably became established in the Hills when the climate cooled and the boreal forests shifted southward approximately 3500 years ago (Hoffmann and Jones 1970).

There have been no recent reports of Lynx canadensis in the area and it possibly no longer occurs there. Any Lynx moving into the area would probably be wanderers from the mountains to the west.

Mustela nivalis is possibly a recent invader, as Soper (1964) indicated that no specimens were known from the area. The occurrence of Mustela erminea is poorly known and it could be either a relict population or a recent invader from the north or west. There is too little evidence to say.

Since the separation of the Sorex cinereus complex into two species, the distribution of Sorex cinereus is poorly understood. It is not possible to determine whether it is a relict or invading population because, like Mustela erminea, there are too few records.

The only species of this faunal element that is widely distributed and common is Microtus pennsylvanicus. The race found here, M. p. insperatus, is a grassland form that probably moved to the area from the southeast.

Campestrian Faunal Element

Species assigned to the campestrian faunal element are closely associated with the interior grasslands of North America. The centre of this faunal element is in the Nebraska-Kansas area (Armstrong 1972). Seven species from southeastern Alberta are assigned to this unit. Two, Perognathus fasciatus and Onychomys leucogaster, approach the northern limit of their range in this area. The ranges of the other five species are more extensive and extend well beyond the study area.

The assignment of Spermophilus richardsonii to this element is based on its restriction to grassland habitats (Jones et al. 1983). Hoffmann and Jones (1970) and Armstrong (1972) assign it to the Great Basin and Cordilleran faunal units, respectively, but Zegers (1984) and Michener and Koepl (1985) suggests that Spermophilus richardsonii had a centre of origin in the Great Plains.

Lepus townsendii is a mammal of the open plains. Jones et al. (1983) suggested that it has been forced out of much of its former range farther south due to agricultural practices and climatic change. Soper (1964) suggested its range in Alberta, was expanding northward due to land clearing for farming. Lepus townsendii, Spermophilus tridecemlineatus, Perognathus fasciatus, and Onychomys leucogaster probably entered southeastern Alberta from the south and southeast, as grassland habitats became available after the retreat of the last glacier.

In 1983 Vulpes velox was introduced to the area from captive breeding stocks. The original population, however, was probably derived from populations occurring to the southeast.

Sorex haydeni is included in this faunal element on the basis of the suggestion by van Zyll de Jong (1975) that the ancestors of Sorex haydeni moved south from a Beringian refugium and Sorex haydeni developed on the southern grasslands.

Cordilleran Faunal Element

Species of the cordilleran faunal element have affinities to the mountains west and southwest of the study area. The centre of distribution for this element is in the Idaho-Wyoming region (Armstrong 1972). Five species belong to this faunal element, none is widely distributed or abundant in the study area.

Sorex monticolus, Microtus longicaudus, and Zapus princeps are found in damp meadows on the grasslands and the Cypress Hills. These species probably dispersed into the area from the west. Marmota flaviventris and Neotoma cinerea are relatively recent invaders. Their probable route of invasion was from the west or southwest along the Milk River valley.

Great Basin Faunal Element:

The cold desert of the Columbian Plateau of Idaho, Washington, and Oregon contributed five species to southeastern Alberta. Species assigned to this faunal element are generally associated with sagebrush communities (Hoffmann and Jones 1970), however, only one of the five species found in southeastern Alberta is closely associated with sagebrush. Lagurus curtatus is found almost exclusively in such habitat in the study area, the other four species have more diverse ecological tolerances.

Myotis evotis and Myotis volans are found along the rocky outcrops of the Milk River, the route they probably followed during expansion into the area from the southwest.

Sylvilagus nuttallii is widely distributed in the area and is relatively common. Its route of invasion was probably from the south and southwest along the brushy coulee systems associated with the Milk River.

Thomomys talpoides is found mainly in open grassy areas from the Cypress Hills to the open plains. Cultivated fields or disturbed areas have contributed to the dispersal of this species in the area. The centre of origin is not certain (Hoffmann and Jones 1970, Armstrong 1972), but it is possibly of cordilleran origin and probably expanded into the area from the south and west.

Lagurus curtatus is relatively widely distributed in southern Alberta and it may still be expanding its range (Salt and Wershler 1975). The most probable source of expansion into the study area was from the south or southeast.

Sonoran Faunal Element

The arid regions of the southwestern United States and northern Mexico contributed one species, Reithrodontomys megalotis, to the mammalian fauna of southeastern Alberta. Only one specimen of this species is known from the study area. Reithrodontomys megalotis reaches the northern limit of its range in or just south of the study area. Whether there is a viable population in the area or whether the single specimen was an accidental occurrence cannot be determined. If a viable population exists, it would have entered from the south.

Widespread Species With Undetermined Faunal Region Origins

The distributional patterns of the 25 species included in this category are so extensive it is not possible to assign these species to a faunal element.

Canis lupus, Ursus arctos, and Bison bison no longer occur in the area. The original population of Cervus elaphus was exterminated and the resident population has been introduced. Individual Canis lupus may wander into the area, possibly from the mountains to the west, but no resident population currently exists.

Although it is not possible to assign species in this category to a given faunal element, some clues to their possible origin can be obtained by examining the ranges of the subspecies involved. For example, Myotis lucifugus carissima, Myotis ciliolabrum ciliolabrum, Erethizon dorsatum epixanthum, Odocoileus hemionus hemionus, and Antilocapra americana americana have western or southwestern affinities. On the other hand Eptesicus fuscus pallidus, Castor canadensis missouriensis, Peromyscus maniculatus nebrascensis, Ondatra zibethicus cinnamominus, Canis latrans latrans, and Odocoileus virginianus dacotensis have southern or southeastern affinities.

COMPARISON OF THE FOREMOST STUDY AREA TO OTHER FAUNAL STUDY AREAS:

Another perspective on the zoogeographic affinities of the mammals of southeastern Alberta can be obtained by comparing the mammals of the Foremost area to nearby areas where similar studies have been conducted. Lampe et al. (1974) studied the mammals of southeastern Montana, approximately 500 km southeast of the Foremost study area, and Smith (1979) studied the mammals of the Edmonton area, approximately 550 km northwest of the Foremost study area.

Seventy-four species of mammals occur in the three areas, 52 and 50 species for the Edmonton and Montana areas, respectively, and 54 for the Foremost area. Foremost shares 35 species with the Edmonton area and 35 with the Montana area. Five species found in the Foremost area are not shared with either Edmonton or Montana (Table 1).

Table 1: Faunal Affinities of Species Shared with Foremost Study Area

	<u>Edmonton Study Area</u>	<u>Southeastern Montana Study Area</u>
Boreal	8	2
Campestrian	3	5
Cordilleran	2	1
Great Basin	1	4
Sonoran	0	1
Widespread	21	22

The mammalian fauna of the Foremost area differs from the Edmonton area fauna by the inclusion of more species with southern affinities.

Hoffmann and Jones (1970) showed the geographical centres of abundance of the Campestrian, Cordilleran, Great Basin, and Sonoran faunal elements to be south of the Foremost study area. If the species assigned to these faunal elements are combined and if the ranges of the subspecies of all species from the area are taken into consideration, the number of taxa with southern affinities (34) is greater than the taxa with northern affinities (10).

The differences between the Foremost and Montana areas are less evident, but they are sufficiently great to indicate the two areas are not the same faunistically. Sixteen species are found in the Foremost area that are not found in southeastern Montana. Six belong to the Boreal faunal element, four to the Cordilleran element, two to the Campestrian, and one to the Great Basin. The three widespread species (Ondatra zibethicus, Mustela vison, and Lynx rufus) are not reported to occur in southeastern Montana because of a dearth of specimen evidence. However, Lampe et al. (1974) indicate that these species most likely occur in the area because of their occurrence in adjacent areas and the availability of suitable habitat.

Hagmeier (1966) showed that the mammalian fauna of North America could be assigned to regions he designated as "mammal provinces" on the basis of the homogeneity of species involved. The three areas discussed here fall within the following mammal provinces: the Edmonton area belongs to the Western Canadian province, the Foremost study area to the Saskatchewanian province, and southeastern Montana to the Kansan province (Hagmeier 1966). The present study shows that Edmonton, Foremost, and southeastern Montana have different mammalian faunas and it supports the assignment of these areas to separate mammalian provinces.

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Appendix 1. CHECKLIST OF MAMMALS OF SOUTHEASTERN ALBERTA

Masked Shrew	<u>Sorex cinereus cinereus</u>
Prairie Shrew	<u>Sorex haydeni</u>
Dusky Shrew	<u>Sorex monticolus obscurus</u>
Little Brown Bat	<u>Myotis lucifugus carissima</u>
Long-eared Bat	<u>Myotis evotis evotis</u>
Long-legged Bat	<u>Myotis volans interior</u>
Western Small-footed Bat	<u>Myotis ciliolabrum ciliolabrum</u>
Silver-haired Bat	<u>Lasionycteris noctivagans</u>
Big Brown Bat	<u>Eptesicus fuscus pallidus</u>
Hoary Bat	<u>Lasiurus cinereus cinereus</u>
Nuttall's Cottontail	<u>Sylvilagus nuttallii grangeri</u>
Snowshoe Hare	<u>Lepus americanus americanus</u>
White-tailed Jack Rabbit	<u>Lepus townsendii campanius</u>
Least Chipmunk	<u>Eutamias minimus borealis</u>
Yellow-bellied Marmot	<u>Marmota flaviventris nosophora</u>
Richardson's Ground Squirrel	<u>Spermophilus richardsonii</u> <u>richardsonii</u>
Thirteen-lined Ground Squirrel	<u>Spermophilus tridecemlineatus</u> <u>pallidus</u>
Red Squirrel	<u>Tamiasciurus hudsonicus</u>
Northern Pocket Gopher	<u>Thomomys talpoides</u>
Olive-backed Pocket Mouse	<u>Perognathus fasciatus</u>
Beaver	<u>Castor canadensis missouriensis</u>
Western Harvest Mouse	<u>Reithrodontomys megalotis dychei</u>
Deer Mouse	<u>Peromyscus maniculatus nebrascensis</u>
Northern Grasshopper Mouse	<u>Onychomys leucogaster missouriensis</u>
Bushy-tailed Wood Rat	<u>Neotoma cinerea cinerea</u>
Southern Red-backed Vole	<u>Clethrionomys gapperi loringi</u>
Meadow Vole	<u>Microtus pennsylvanicus insperatus</u>
Long-tailed Vole	<u>Microtus longicaudus vellerosus</u>
Sagebrush Vole	<u>Lagurus curtatus pallidus</u>
Muskrat	<u>Ondatra zibethicus cinnamominus</u>
House Mouse	<u>Mus musculus</u>

Appendix 1 cont'd

Western Jumping Mouse	<u>Zapus princeps minor</u>
Porcupine	<u>Erethizon dorsatum epixanthum</u>
Coyote	<u>Canis latrans latrans</u>
Gray Wolf	<u>Canis lupus irremotus</u>
Red Fox	<u>Vulpes vulpes regalis</u>
Swift Fox	<u>Vulpes velox</u>
Grizzly Bear	<u>Ursus arctos</u>
Raccoon	<u>Procyon lotor hirtus</u>
Ermine	<u>Mustela erminea invicta</u>
Least Weasel	<u>Mustela nivalis rixosa</u>
Long-tailed Weasel	<u>Mustela frenata longicauda</u>
Mink	<u>Mustela vison lacustris</u>
Badger	<u>Taxidea taxus taxus</u>
Striped Skunk	<u>Mephitis mephitis hudsonica</u>
Cougar	<u>Felis concolor missoulensis</u>
Canada Lynx	<u>Lynx canadensis canadensis</u>
Bobcat	<u>Lynx rufus pallescens</u>
Wapiti	<u>Cervus elaphus</u>
Mule Deer	<u>Odocoileus hemionus hemionus</u>
White-tailed Deer	<u>Odocoileus virginianus dacotensis</u>
Moose	<u>Alces alces andersoni</u>
Pronghorn	<u>Antilocapra americana americana</u>
Bison	<u>Bison bison bison</u>

Appendix 2. BIOGEOGRAPHIC FAUNAL ELEMENTS (introduced and hypothetical species not included)

Boreal Faunal Element (8 species)

- Masked Shrew
- Snowshoe Hare
- Least Chipmunk
- Southern Red-backed Vole
- Meadow Vole
- Ermine
- Least Weasel
- Lynx

Campestrian Faunal Element (7 species)

- Prairie Shrew
- White-tailed Jack Rabbit
- Richardson's Ground Squirrel
- Thirteen-lined Ground Squirrel
- Olive-backed Pocket Mouse
- Northern Grasshopper Mouse
- Swift Fox

Cordilleran Faunal Element (5 species)

- Dusky Shrew
- Yellow-bellied Marmot
- Bushy-tailed Wood Rat
- Long-tailed Vole
- Western Jumping Mouse

Great Basin Faunal Element (5 species)

- Long-eared Bat
- Long-legged Bat
- Nuttall's Cottontail
- Northern Pocket Gopher
- Sagebrush Vole

Sonoran Faunal Element (1 species)

- Western Harvest Mouse

Widespread (25 species)

- Little Brown Bat

Appendix 2 cont'd

Widespread (25 species) cont'd

Western Small-footed Bat
Silver-haired Bat
Big Brown Bat
Hoary Bat
Beaver
Deer Mouse
Muskrat
Porcupine
Coyote
Gray Wolf
Red Fox
Grizzly Bear
Raccoon
Long-tailed Weasel
Mink
Badger
Striped Skunk
Cougar
Bobcat
Wapiti
Mule Deer
White-tailed Deer
Pronghorn
Bison

N.L.C. - B.N.C.



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